MULTIMEDIA UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2018 / 2019**

## TAL 7011 – ARCHITECTURE OF LARGE SOFTWARE SYSTEMS

( All sections / Groups )

3 OCTOBER 2018
8:00 P.M. – 10:00 P.M.
( 2 Hours )

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**INSTRUCTIONS TO STUDENTS**

1. This Question paper consists of 6 pages (including cover page) with 5 Questions only.

2. Attempt **FOUR** out of **FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

**Question 1** (2 + 3 + 1 + 2 + 2 marks)

MyTuition is a tuition centre based in Puchong that provides tuition classes for primary and secondary school students. It runs its business at a three-storey shop lot where the administration is done at the ground floor and the tuition classes are conducted at the upper floors.

A few years ago an MMU trainee developed a simple system to support the following processes:

- Registration of new students
- Registration of students to classes
- Payment of fees
- Generation of student and fee reports

The system is implemented through a few networked computers at the ground floor of the tuition centre.

Due to increasing number of students, more classes are conducted and part-time teachers are also employed. The management of the tuition centre wants to develop a new Intranet system so that additional computers can be placed in the classrooms to display timetables, take attendance and record the teaching hours of part-time teachers.

a) You are appointed as the software architect of the new system. Discuss any TWO main responsibilities as the architect of this system.

b) Draw the Architecture Business Cycle for this system.

c) Based on the information given, write a quality attribute scenario for ONE of the following quality attributes:
   - Usability
   - Modifiability

d) Draw the quality attribute scenario diagram based on the description in Question 1(c).

e) Describe at least ONE possible tactic to achieve the quality attribute in Question 1(c).

**Continued...**

**Question 2** (2 + 4 + 4 marks)

The Faculty of Computing & Informatics is proposing a new intranet system to manage programme documentation that conforms to MQA requirements. This system is an extension to the current system where additional documentation on programmes such as programme objectives, programme outcomes and programme structures can be maintained by programme coordinators in the faculty. Furthermore, the Quality Assurance Department and faculty manager can obtain reports from the new system in order to fulfil MQA documentation requirements.

a) Identify at least TWO possible architectural drivers for this system. State any assumptions that you have, if additional information are required.

b) Explain how you can use Attribute-Driven Design (ADD) to produce a coarse-grained architecture of this system. Clearly describe the steps in producing the architecture.

c) Explain the criteria you can use to identify a suitable architectural pattern to expand the software architecture for this system. Using these criteria, select an architectural pattern that is suitable and briefly describe the main features of the architectural pattern.

**Continued ...**

**Question 3** (3 + 2 + 3 + 2 marks)

MyMobile Sdn Bhd is a software development company that is developing e-commerce related applications using mobile phones. The company is developing a set of integrated programs and applications in a project call MyBizApp. MyBizApp would provide companies the facilities to advertise their products and services, and mobile phone users would be able to order the products and services through MyBizApp.

a) The primary purpose of software architecture is to serve as a communication vehicle among stakeholders. Different stakeholders will use the architecture to accomplish different tasks and thus require different views of the architecture. Produce a candidate view list for any THREE possible stakeholders of MyBizApp project. Specify the level of details required for each view.

b) Suggest a possible software component to support the features described above. Using Unified Modelling Language (UML), draw the diagram representing the component.

c) Describe the following Model Driven Architecture (MDA) concepts:

- Platform Independent Model
- Computation Independent Viewpoint
- Platform Model

d) Using an example from MyBizApp project, describe how these models can be used to develop the system.

**Continued...**

**Question 4** (4 + 3 + 3 marks)

Multimedia Business Bhd is a company that has grown throughout the years. In the beginning, they only used a computerized Financial System in their Accounts Department. As their business grew, other departments such as Human Resources, Sales & Marketing and Purchasing Departments purchased computerized systems to support their activities. Each of these systems is supplied by different vendors. These systems are fully implemented and have been used for a few years.

The top management of the company decided to integrate the different systems into an enterprise system to improve efficiency and reduce redundancies in the different systems.

a) Describe how the Jacobson use case technique is used to handle the complexity of this system. Illustrate with a diagram.

b) Describe TWO problems with Jacobson's use case technique. Give one possible approach to resolve ONE of the problems.

c) For the new system, a team of system architects planned the architectural model of the solution before assigning the work packages to the developers. The developers were required to develop the new software using object-oriented technology (which also includes integration with existing components from the different vendors).

Describe how the architectural components can be mapped to objects and classes using the following mapping types:

a. Object Agent view
b. High-level Object Agent view
c. Functional view

**Continued...**

**Question 5** (1 + 2 + 3 + 2 + 2 marks)

MyCar Management System is an enterprise system for a car vendor and servicing company, that integrates a few subsystems such as Sales Management System, Financial Management System, Product Management System, and Service Management System.

a) Using this system as example, explain the purpose of an enterprise software system.

b) Describe any TWO structural components of an enterprise architecture.

c) Based on your course assignment, draw a software architecture diagram that shows the integration of these different subsystems.

d) Describe how the system can be integrated using the *gateway* architecture integration style.

e) Discuss an alternative architectural integration style that can be applied to integrate these different systems. Compare this against the gateway architecture integration style described in Question 5(d).

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